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REVIEW OF U.S.-U.S.S.R. COOPERATIVE AGREEMENTS ON SCIENCE AND TECHNOLOGY

SPECIAL OVERSIGHT REPORT NO. 6

SUBCOMMITTEE ON
DOMESTIC AND INTERNATIONAL
SCIENTIFIC PLANNING AND ANALYSIS
OF THE
COMMITTEE ON
SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES
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LETTER OF TRANSMITTAL

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE AND TECHNOLOGY,
Washington, D.C., November 10, 1976.

Hon. OLIN E. TEAGUE,
Chairman, Committee on Science and Technology,
House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: I am transmitting herewith a report on the operation of the U.S.–U.S.S.R. Cooperative Agreements on Science and Technology.

This Subcommittee's predecessor, the Subcommittee on International Cooperation in Science and Space of the House Committee on Science and Astronautics, held hearings on this subject in June, 1972. This was one month after the Moscow Summit Meeting at which the first of a series of accords were signed.

The purpose of those hearings, as stated by the Subcommittee's Chairman, the Honorable James W. Symington, was "to provide the committee with better insight into their full meaning, and their implications for the future." He added that the committee would also like to explore potential methods for implementing the agreements.

It thus seemed to be a propitious time in late 1975—following a trial period of over three and one-half years—to review the policies and programs of these bilateral agreements and to focus particularly on the scientific research benefits. The hearings were held on November 18–20, 1975, in Washington, D.C.

The Summary and Analysis was prepared by Claire Riley Geier, analyst in the Science Policy Research Division, Congressional Research Service, Library of Congress, in collaboration with the Subcommittee staff.

I commend it to you and to all Members of the Committee.

Sincerely yours,

RAY THORNTON, *Chairman,*
Subcommittee on Domestic and International
Scientific Planning and Analysis.

CONTENTS

	Page
Letter of Transmittal	III
Contents	V
Special Oversight	VII
Recommendations	1
Summary and analysis of hearings	5
Introduction	5
Part I: Summary and analysis	9
Status	9
Organization and administration	11
Funding	13
Foreign policy considerations	15
Cooperative scientific research	17
(A) Academy exchanges	17
(B) Role of Scientists	17
Reciprocity	18
Part 2: Three promising agreements	23
The agreement on scientific and technical cooperation	23
(A) Electrometallurgy working group	23
(B) Chemical catalysis working group	24
The agreement on studies of the world ocean	25
The agreement on environmental protection	27
Appendix: List of witnesses and statements	31

SPECIAL OVERSIGHT

Research and development is conducted throughout the Federal Government. Most agencies and departments support research and development to further advances in those fields of science and technology which are related to their mission.

In the House of Representatives these research and development activities are reviewed individually by a number of standing Committees having jurisdiction of the various programs, agencies, and departments. Beginning with the 94th Congress, the rules of the House provide that a continuing review of the entire Federal research and development effort be done. For this purpose the Committee on Science and Technology is charged with the function of Special Oversight in this area. Rule X, paragraph 3 (f) provides that "The Committee on Science and Technology shall have the function of reviewing and studying, on a continuing basis, all laws, programs, and Government activities dealing with or involving non-military research and development." This Special Oversight function is to be performed in addition to the legislative and direct oversight function of the standing committees.

The review and the recommendations included in this report are made pursuant to this Special Oversight provision of the House rules.

RECOMMENDATIONS

The Subcommittee, having received and reviewed the public testimony and statements from witnesses on the U.S.–U.S.S.R. Cooperative Agreements on Science and Technology, makes the following recommendations:

RECOMMENDATION 1

THE U.S.–U.S.S.R. COOPERATIVE AGREEMENTS IN SCIENCE AND TECHNOLOGY SHOULD BE EVALUATED ON THE BASIS OF THE SCIENTIFIC AND TECHNOLOGICAL BENEFITS THEY YIELD TO THE NATION

The Cooperative Agreements in Science and Technology were entered into initially for the political purposes of reducing tensions and furthering international relations between the United States and the Soviet Union. However, their success both in terms of those objectives and in terms of furthering the application of science and technology to common problems in the two countries will ultimately depend on the benefits they yield to the United States and the Soviet Union. The agreements should therefore be evaluated on how well they serve to bring about and further an equal and reciprocal exchange of new and useful science and technology.

RECOMMENDATION 2

THE AMERICAN SIDE OF THE COOPERATIVE AGREEMENTS PROGRAM SHOULD INSURE THE COORDINATION AND REVIEW OF THE SCIENTIFIC AND TECHNOLOGICAL ACTIVITIES OF THE JOINT COMMISSIONS BY A CENTRALLY-PLACED, COMPETENT AUTHORITY WITHIN THE EXECUTIVE BRANCH

Organizationally, the eleven U.S.–U.S.S.R. Cooperative Agreements appear to lack an overall, designated scientific authority to whom the co-chairmen for the American side can report on purely scientific developments, or a visible source to whom the Congress can turn for program accountability. Above the co-chairmanship level, scientific leadership appears to be obscure. It would seem that from the nature of the program, a central co-ordinator of sufficiently high rank

71-243—76——2

to effect science policy, but technically broad in competence to advise on matters of scientific substance, is required. The Director of the Office of Science and Technology Policy is well qualified to carry out this function and should be considered for this task.

RECOMMENDATION 3

Updated Statements of Operational and Administrative Principles Should Be Provided by the American Co-Chairmen of the Joint Commissions for the Guidance of the Executive Secretaries and Other Administrators in the Respective Lead Agencies and for the Participating Scientists

The program has not as yet realized its potentials. Some of its shortcomings are attributable to the inadequacy of the current structure under which the overall science and technology program operates, including lack of sufficient and proper operational guidelines, staffing, and funding. Although the U.S.–U.S.S.R. science program is relatively new, for which some justifiable allowance should be made, it would appear reasonable to expect that during the four years which have elapsed since the initial agreements were signed, a body of administrative principles and problem-solving experiences should have emerged on the American side which could be "codified", shared with, and provide guidance to, the Program's administrators and scientists at all levels of the agreements.

RECOMMENDATION 4

All Current Projects Should Be Critically Examined on a Periodic Basis To Insure That the Science and Technology Cooperative Agreements Program as a Whole Is Proceeding on a Reciprocal and Mutually Beneficial Basis and in the Most Effective Manner

Periodically, and no less than annually, all individual Working Group projects, now numbering about 150, should be subjected to a critical evaluation. The principle of reciprocity should be broadly applied. There may be individual Working Group projects where one side gains more than the other while in other projects the reverse may be true. But on balance, the entire program should be evaluated to insure that both nations give as much as they receive. The benefits gained by each nation should consist of scientific and technological knowledge which is helpful and useful in advancing research and development objectives. Resources should be concentrated on projects which offer a demonstrably greater potential for more meaningful scientific or technical returns. Such evaluation will insure that worthwhile projects will not suffer at the expense of marginal projects.

RECOMMENDATION 5

New Projects To Be Carried Out Under the Existing Commissions and Their Working Groups Should Be Carefully Screened To Insure That Only Those With a High Potential for Success Are Initiated

In reviewing proposals by American or Soviet scientists for the initiation of new projects, the United States side of the Joint Commissions should exercise a more discriminatory project selectivity, particularly in favor of projects where mutually keen interest is demonstrated, where the scientific problem presented is one in which both sides have strong activity, and where the prospects for success appear good.

RECOMMENDATION 6

Projects Which Become Inoperative Through Lack of Performance by the Soviet Side Should, Following Reasonable Requests for Compliance, Be Promptly Terminated in a Forthright, Businesslike Fashion

As a case in point, under the Agreement on Agriculture, the Soviet side told its American counterparts at a joint workshop that the USSR had conducted little, if any, short-run forecasting. The Department of Agriculture, however, believed that in such a highly controlled economy there had to be some activity which was roughly comparable to short-term forecasting as practiced in the United States. Subsequently, it was discovered by the U.S. side that, in fact, work of this kind was being conducted and the individuals in the USSR in charge of this activity were identified. When such a situation develops, it should lead to immediate requests for cooperation on the part of the Soviet side. But if the project does not become operative, it should be promptly terminated in a manner which makes it clear that the lack of full, forthright compliance in accordance with the language and intent of the agreement is the cause.

RECOMMENDATION 7

Lead Agencies of the Executive Branch Responsible for the Scientific Conduct on the U.S. Side of the Scientific Agreements Should Submit Requests for Adequate Funds To Carry Out Their Commitments Under the Agreements to the President for Inclusion in the Annual Federal Budget

The haphazard funding procedures currently employed by the Federal departments and agencies involved in this bilateral program has increasingly impeded the performance of the participants and has adversely affected the progress of many projects. Because of the failure to provide line-items in lead agency budgets for this international program, funds

now must be transferred from domestic programs to support projects of the former. If the lead agencies are to fulfill their assigned missions under this program, then adequate funding commensurate with their responsibilities should be provided.

RECOMMENDATION 8

Departments and Agencies of the Federal Government Serving as Lead Agencies for Individual U.S.–U.S.S.R. Agreements Should Select the Personnel To Staff Both the Post of Executive Secretary and the Other Staff Positions in Their Own Secretariats for Those Agreements

The Executive Secretaries for each of the agreements are, with one exception, selected, employed by, or detached to, the designated lead agencies. The exception is the Agreement on Scientific and Technical Cooperation, for which the National Science Foundation currently is the designated lead agency. However, the Executive Secretary for this agreement is located in the Department of State. This anomaly removes the secretariat from the staff of the lead agency and excludes the NSF from membership on the Executive Secretaries Committee, which is chaired by the Department of State. To effect sound scientific guidance over the Scientific and Technical Cooperative Agreement the NSF should appoint its own Executive Secretary. The Department of State should continue to provide foreign policy guidance for the overall program through the U.S. co-chairmen and by its chairmanship of the Under Secretary's Committee of the National Security Council and the Executive Secretaries Committee.

RECOMMENDATION 9

In Keeping With Its Oversight Assignment the House Science and Technology Committee Should Be Furnished on a Current and Continuous Basis With Adequate Documentation by the Executive Branch on the Status of the U.S.–U.S.S.R. Cooperative Agreements on Science and Technology

The first hearings on this subject were held by this Subcommittee's predecessor in June 1972, one month after the signing of the first of a series of bilateral agreements between the U.S. and the U.S.S.R. on science and technology. The second and most recent hearings on these agreements were held in mid-November 1975, three and one-half years later. From the Subcommittee's viewpoint, the informational gap which had developed during the interval between hearings was evident during the latter hearings. In order to be better informed at subsequent hearings and to avoid an informational catch-up situation as had prevailed, it is recommended that the Committee be provided reports on this program in order to assure it an informed foundation for carrying out its Congressional oversight responsibilities in the future.

SUMMARY AND ANALYSIS OF HEARING

Introduction

The Subcommittee on Domestic and International Scientific Planning and Analysis (DISPA) held oversight hearings on November 18–20, 1975, to review the past progress and future prospects of the program conducted under the U.S.S.R. Cooperative Agreements in Science and Technology.

In his opening statement, Chairman Ray Thornton remarked:

> The purpose of these hearings will be to evaluate the status of the American-Soviet bilateral research program since the first accords were signed at a Summit meeting in Moscow in May 1972 . . . I am mindful that the program was initiated in 1972 in a climate of detente. It has been widely acclaimed as a turning point in the relations between the world's two major powers. However, I feel that these government-to-government programs must be scrutinized and evaluated on the basis of their own merits, as if they had been signed with any other nation.[1]

The focus of these hearings therefore was to examine the scientific research aspects of the agreements, divorced of political considerations to the extent possible, and apart from the fact that they had been signed primarily for foreign policy objectives. Although restricted to scientific research, the Subcommittee was mindful that some technology-related testimony was to be expected. In short, the Subcommittee wished to determine if the accords, as such, provided mutual scientific benefits and if not, why not?

Beginning with the signing of the first four agreements at a summit meeting in Moscow in the spring of 1972, there are eleven agreements now in effect calling for cooperative efforts in scientific technology research.

The DISPA Subcommittee received testimony from six witnesses directly involved in three agreements: Scientific and Technical [2]; Environmental Protection; and Studies on the World Ocean. Testimony was also received from three other witnesses who were involved in

[1] "U.S.–U.S.S.R. Cooperative Agreements in Science and Technology"; Hearings, Sub-Committee on Domestic and International Planning and Analysis, Committee on Science and Technology, U.S. House of Representatives, 94th Congress, First Session, Nov. 18, 19, 20, 1975 [No. 53], Washington, D.C., 1976, p. 1. [Note: Pagination to other quotations from same Hearings will be noted in brackets.]

[2] This agreement which is the umbrella or model agreement for the others was the subject of a Committee background study which served as a "briefing paper" for DISPA for the November hearings. See, "Background Materials on US–USSR Cooperative Agreements in Science and Technology," Report (Serial P) Committee on Science and Technology, House of Representatives; prepared by the Science Policy Research Div., Congressional Research Service, Library of Congress, November 1975, Washington, D.C., 93 pp.

private-sector, scientific exchanges of some duration with the Soviet Union.

Additionally, statements were submitted for the hearing record (See Appendix I, Hearings), by the seven U.S. Chairmen representing the remaining eight agreements.[3] In addition to the statement on Medical Science and Public Health, papers were also received for the following six cooperative agreements: space; agriculture; transportation; peaceful uses of atomic energy; energy; and housing and other construction.

The government witnesses addressed themselves to both the form and substance of the agreements. Unlike earlier bilateral arrangements between the two nations, the scientific cooperative agreements were instituted as problem-solving instruments. Hence, the participants at the initial meetings explored and selected those broad scientific areas where mutual problems existed that challenged both parties and where solutions appeared feasible, e.g., pollution and energy.

After areas of general interest were identified a Joint Commission and secretariat were created under which specific joint working groups would function. Both the Commissions and the working groups are co-chaired by an authorized representative from each country. Subtopics, which now number about 150, under each working group were subsequently identified and organized into projects in which the actual work of joint scientific research is carried out. Not all projects however have progressed to the actual working phase. Under the Scientific and Technical Agreement, 24 of 49 projects were operative in October 1975, whereas only 4 projects had been functioning during the previous October.

The witnesses discussed other administrative features of the agreements program including the role of lead agencies (i.e. those with foremost administrative or substantive responsibilities for a specific agreement, or project), coordination and policy (including the roles of the Department of State and the National Security Council) and attendant considerations concerning security, foreign policy, funding, travel, and problems of translation.

Substantively, two (Chemical Catalysis and Electrometallurgy) of the twelve working groups under the Agreement on Scientific and Technical Cooperation were examined in some depth. While no working group leader from the other two agreements, i.e. Environmental Protection and World Ocean, testified at the hearings because of time limitations, the U.S. Chairman or his designated alternate for these agreements covered their respective areas in a forthright and comprehensive manner.

The consensus of the witnesses was that:

- The program overall was moderately successful;
- Progress, although unevenly developed, had been mutually beneficial thus far;
- The potential for future scientific benefits exists for both parties;
- The rapid proliferation of projects especially under the older agreements requires careful review for purposes of pruning un-

[3] The discrepancy here between the number of chairmen and that of the agreements is attributable to the fact that certain responsibilities under the Agreement on Artificial Heart Research and Development have been assumed by the authorities in charge of activities under the Agreement in Medical Science and Public Health.

productive or marginal programs while preserving those which demonstrated prospects for meaningful benefits;

- Those projects which had failed to live up to reasonable expectations or to an otherwise foreseeable potential because of unnecessary or unwarranted delays by the Soviet side, with due allowance for the normal bureaucratic pace, should be promptly terminated;
- Some worthwhile projects might suffer severely unless immediate measures are undertaken to resolve the funding issue keenly felt by some lead agencies, a problem which in turn, may also affect the translation process;
- The role of the Department of State could be more clearly defined and possibly confined to matters of foreign policy to assure the unfettered pursuit, between the scientists of both parties, of scientific objectives with due allowance for policy and national security restrictions. A separate, central coordinating organization was conceived necessary in this context to administer to the strictly substantive side of the agreements and to the resolution of day-to-day scientific problems.
- The committee, in fulfilling its oversight function, should be provided, on a regular basis, with current status reports on the U.S.–U.S.S.R. scientific agreements program by the agencies of the Executive Branch responsible for that program.

PART I: SUMMARY AND ANALYSIS

Status

The United States and the U.S.S.R. have signed eleven cooperative agreements on science and technology under which approximately 150 authorized projects are currently functioning, beginning to function, or are planned.

These bilateral agreements and the dates when they were signed, cover the fields of:

- scientific and technical cooperation—May 24, 1972
- cooperation in environmental protection—May 23, 1972
- cooperation in medical science and public health—May 23, 1972
- space cooperation—May 24, 1972
- cooperation in agriculture—June 19, 1973
- cooperation in transportation—June 19, 1973
- cooperation in studies of the world ocean—June 19, 1973
- scientific and technical cooperation for peaceful uses of atomic energy—June 21, 1973
- cooperation in the field of energy—June 28, 1974
- cooperation in the artificial heart research and development—June 28, 1974
- cooperation in the field of housing and other construction—June 28, 1974

Within the Agreement on Scientific and Technical Cooperation alone, 12 working groups operate which collectively conduct 49 projects.

According to Dr. H. Guyford Stever, Science Adviser to the President and U.S. Co-Chairman of the Joint Commission for the Agreement on Scientific and Technical Cooperation, progress within many of the working group projects of the agreement has been uneven. He noted that there were many reasons for this imbalance including: the difference in the governmental structures of the two nations, the difficulty in arranging meetings and in agreeing on areas of mutual concern, and the general complexity involved in any international agreement.

In addition to the progress in the three agreements on which individual witnesses testified (i.e. Scientific and Technical, Environmental Protection, and Studies on the World Ocean), accomplishments for the other eight agreements have been impressive on balance, although some unevenness also has been experienced. Examples of progress under the latter were, according to Mr. Myron Kratzer, Acting Assistant Secretary for Oceans and International Environmental and Scientific Affairs, Department of State:

> The successful mission and the safe return of the Cosmonauts and Astronauts demonstrated operationally compatible

71-243—76——3

systems and made a major contribution towards developing a rescue capability for future manned flights.[1] [p. 46]

Under the Energy Agreement of 1974, experts on coal, oil, gas, and information and forecasting, have made progress in formulating recommendations for joint projects. Activity in the on-going electric power projects has included participation by U.S. magnetohydrodynamics experts in the testing of a U.S.-constructed channel on a Soviet pilot facility. The tests provided useful data on various electrode materials. [p. 47]

On the statement made by Mr. Kratzer concerning the impressive accomplishments of the agreements, Congressman Conlan queried:

> Mr. Kratzer. . . . you remarked that the accomplishments to date under eight of the agreements, as well as under the remaining three, "have been impressive." The GAO study, entitled "Progress Report on U.S.-Soviet Union Cooperative Programs", concludes that "to date the exchange has been limited and of limited technical benefit to the United States."[2] How would you reconcile this? [p. 56]

Mr. Kratzer responded that the GAO had based its report on 1973 findings and since that time much progress has been made.

However, in the area of application of computers to management, under the Agreement on Scientific and Technical Cooperation, Dr. Gary Fromm, Director of the Washington office of the National Bureau of Economic Research, stated that although there has been reasonable progress in this area to date. ". . . measured on an opportunity basis, the program is far from realization of its short or long-term potential." [p. 93]

Dr. Fromm attributed these shortcomings ". . . to the inadequacy of the current structure under which the overall Science and Technology program operates, including lack of sufficient and proper operational guidelines, staffing, and funding." [p. 93] In general, concerning the working group on application of computers to management, he noted:

> While progress has been slow, initial contacts between scores of U.S.–U.S.S.R. scientists have been made and research has begun in a number of areas. Several joint seminars have been held and others are scheduled or planned. [p. 94]

Finally, to indicate the progress to date under the Agreement on Environmental Protection, Environmental Protection Agency Administrator, Mr. Russell Train noted:

> In 1973 exchanges of specialists and information under most of the 39 projects of our Agreement began. In 1974 over 50 meetings took place, and a great amount of information was exchanged on the basis of equality, reciprocity, and mutual benefit as set forth under Article One of our Agreement.

---

[1] It should be noted that this 1972 Agreement's antecedent for the Apollo-Soyuz project was an on-going embryo program begun under an October 1970 Agreement calling for cooperation on technical requirements for compatible rendevous and docking systems; and a second agreement of January 1971 on coordinating certain scientific activities in space science and applications.

[2] General Accounting Office, Report to the Congress, A Progress Report on the United States-Soviet Union Cooperative Programs, by the Comptroller General of the United States, Jan. 8, 1975, p. 42.

> We began to see tangible evidence of what our environmental specialists working together could produce. [p. 124]

As to the future of the agreements, all the witnesses felt that, with revision in the organization and administration of the agreements, including a system for centralized funding, the bi-lateral agreements program would be more beneficial.

Organization and Administration [3]

Because of the government-to-government nature of the cooperative agreements, each agreement is administered by a Joint Commission (or Joint Committee) composed of high level representatives and a Chairman from each side. This is illustrated by the Joint Agreement on Scientific and Technical Cooperation. U.S. Co-Chairman Stever testified that:

> A joint commission was set up to approve cooperation in selected science areas and to provide overall guidance for activities under the agreement.
>
> In addition, a small executive secretariat was established to assist the Commission on a day-to-day basis.
>
> Finally, joint working groups were created to develop specific tasks in the particular science areas and to identify the U.S. institutions and scientists to be involved in these joint tasks. The institutions and scientists involved in the Agreement are from all sectors—government, industry, universities and nonprofit organizations. [p. 3]

Dr. Stever noted that if reciprocity was not forthcoming then U.S. working groups should discontinue their activities unless the Soviet side fulfilled its part of the cooperative ffeort. He said, "As you know, these agreements are based on qud pro quo. As a consequence, there are joint working groups which are looking all the time to see if the exchanges are reasonable." [p. 13]

The work of the eleven Joint Commissions or Committees is conducted by their respective Executive Secretariats under the guidance of a designated government organ (i.e., the Department of State for the Scientific and Technical Agreement and various federal departments or agencies for the other agreements) and an Executive Secretary. These Executive Secretaries meet monthly, as an Executive Secretaries Committee, to discuss the progress and common problems in their respective agreements. The Committee's activities are coordinated by its Chairman, Dr. Oswald Ganley, Acting Deputy Assistant Secretary of State for Advanced and Applied Technology Affairs, who prepares the status reports on the Agreements Program for the National Security Council's Under Secretaries Committee. The reports are then summarized by the NSC for Presidential Review.

Dr. Donald Martineau, Executive Secretary for the Agreement on Studies on the World Ocean and Deputy Associate Administrator for Marine Resources of the National Oceanic and Atmospheric Adminis-

[3] See section on Foreign Policy Considerations for additional treatment of subject.

tration amplified the purpose of the Executive Secretaries Committee meetings:

> It is not the intent of those meetings to provide technical guidance. That is my understanding. I look to it for policy guidance and direction. [p. 75]

Some Committee members were interested in the overall coordination of the Joint Commissions. Specifically, Congressman Conlan asked Dr. Stever, as Chairman of the U.S. side of his Joint Commission, to whom he reported: Dr. Stever responded that he reported to the Under Secretary of State and to the National Security Council with respect to his judgment on the reciprocity of the exchanges.

Asked if the National Security Council directs the work of the working groups and Joint Commissions, Mr. Kratzer replied:

> It has an oversight responsibility which I think is a better way of putting it. It is certainly not, in any real sense of the word, a direct supervisory relationship. Each one of these joint committees is headed by a very senior official, often the Secretary of the government department or agency concerned. [p. 22]

Chairman Thornton asked Dr. Allen Kassof, Director of the International Research and Exchanges Board, his opinion of the Government's responsibilities toward this program as administered by the Department of State within the context of the oversight function of the National Security Council: "Do you think that such a continuing evaluation or oversight by the NSC would be a proper function, even if the administration of the program was performed outside the Department of State?" [p. 102] Dr. Kassof answered that the National Security Council certainly should be informed of developments in the program especially in relation to security matters but, he added, that "should not be confused with the daily administration of these programs. That is a separate matter." [p. 102]

Chairman Thornton asked Dr. Kassof, concerning daily administration of the agreements, whether he preferred that they should be coordinated through the newly proposed Office of Science and Technology Policy or by a quasi-governmental body. Dr. Kassof replied:

> My own preference is for a quasi-governmental organization. The reason for this has to do with a danger to which I alluded to in my prepared testimony, namely, the possibility of confusion between diplomatic and scientific priorities. * * * It seems to me that if we are engaged in these science projects we ought to be doing so because they are important in their own right [p. 102]

On the subject of the part to be played by the Department of State, Mr. Train testified that it should not "run the cooperative effort in a programmatic sense. . . ." He added:

> I think the strength of agreements such as this lies in their being conducted primarily by those with programmatic responsibilities on both sides. When you get the fellow who has a budget control on one side talking with an opposite number who has some comparability as to budget control, they can

> reach agreement and say OK, we can do this. The State Department cannot do this. It cannot commit my staff and my budget. . . . while I think the State Department has an enormously important role, it should be distinguished and kept separate from the direct running of the program. [p. 143]

Dr. Alexander Rich, of the Massachusetts Institute of Technology and Chairman of the Scientific Exchange Board of the National Academy of Sciences, (NAS) testified that the Department of State's role was important in a "catalytic" sense. However, "it should not be an operating arm because the principals really should be the people who are doing the work," he said, adding, "I think you run into too many difficulties if you have someone responsible for it, and someone else running it who is not responsible for it." [p. 249]

When asked by Chairman Thornton for his opinion of an annual Congressional review, Mr. Kratzer responded:

> I think it would be very wise, Mr. Chairman, for the committee to receive, if I could presume to put myself in your shoes, a periodic report on the progress of these agreements. I am sure that we would be very forthcoming in developing such reports for you. [p. 52]

Funding

Although many witnesses commented on one or more of the administrative problems in the agreements program, most of them expressed some concern over the funding arrangements. Chairman Thornton asked how the funding process might be improved, and Dr. Stever replied:

> We are in the agency—I am now speaking as Director of the National Science Foundation—handling our funds in line with our regular procedures. Essentially each agency must fit the U.S.S.R. activities into its own program. You will find it in the budget presentation and justification from the National Science Foundation. . . . A statement to the effect that some of the additional money we come to Congress for, is included for further international cooperative research, primarily with the U.S.S.R. [p. 14]

As an example of the financial pressures upon the National Science Foundation, Dr. Alexander Rich, Chairman of the Science Exchange Board of the National Academy of Sciences, noted that all of the NAS's programs were funded by the National Science Foundation. And, he said, fiscal limitations on the NSF budget, in terms of its international program, has placed pressure on the Academy programs. The above mentioned report prepared by the General Accounting Office also had noted that the lack of centralized funding policies greatly impeded the work of the agreements.[5]

In responding to the GAO's contention that policies for funding the agreements had adversely affected progress under the agreements, Dr. Gary Fromm suggested:

> Funding for the program might better be undertaken by explicit recognition in the Federal budget process and submis-

[5] Op. cit., A Progress Report on United States-Soviet Union Cooperative Programs, p. 46.

sion of requests by the National Science Foundation through the usual channels. Normal procedures would then dictate review by appropriate Congressional committees. Inter-agency transfers or grants and contracts to private organizations could be provided as needed, but the Foundation's submission probably should be comprehensive and cover all fields under the Scientific and Technical Cooperation Agreement. [p. 95]

Dr. Kassof suggested:

> In the future the bilaterals ought to be centrally funded, to the extent that this is a realistic possibility. It is poor procedure to sign agreements and then look for the wherewithall to carry them out. It obliges the participating agencies to compete against their own domestic projects to come up with appropriate budgets, and [it] distorts priorities. [p. 86]

Asked by Chairman Thornton how he would effect an orderly method of funding to accommodate Congressional oversight responsibilities and provide review within the Executive branch, Mr. Train replied:

> I think the funding question is quite crucial; and it is closely tied to the Congressional oversight function. * * * . . . since there is no line item appropriation for this money, it means it is coming out of somebody's normal operating budget, and this tends to pinch. * * *
> I would tend to welcome a specific appropriation to assist in the furtherance of this Agreement. [pp. 141–2]

Some working groups, however, do not have difficulty with funding, testified Dr. John Baldeschwieler, U.S. Chairman of the Working Group on Chemical Catalysis, under the Agreement on Scientific and Technical Cooperation:

> We have found that having an administrative focus in the American Chemical Society has been essential to moving forward. * * *
> The administration of the program was handled by a grant from the National Science Foundation to the American Chemical Society. [p. 210]

Mr. Thornton then asked if a similar method would be a useful guide for other programs. Dr. Baldeschwieler responded affirmatively, noting that this system "has worked beautifully."

The funding problem for the Agreement on Transportation is obviously at a crucial stage as vividly expressed in the following language of the statement submitted by the lead agency, the Department of Transportation:

> The cooperative program is growing to the point that its costs can no longer be taken out of the Department's funding hide, especially in the face of current and anticipated budget cuts. There is a need to provide funds for travel, hire support staff (including interpreters and translators) and fund miscellaneous costs such as the reciprocation of hospitality. Without funding support, the cooperative program will falter and eventually peter out. [p. 316]

Dr. Rich observed parenthetically that the Soviet Union administered the funding of their scientific and technical programs differently from that of the United States.

> One of the most striking differences is in the funding of Soviet Science relative to the funding of science in this country. What one sees in the Soviet Union is a steady rise in the support for science, a rise in which one can perceive a five-year rhythm which is related to the fact that their planning extends over five-year intervals.
>
> However, the steadiness of the rise is quite impressive. In contrast to this, the funding of American science has considerable instability, with alternating periods of feast and famine. [p. 232]

Dr. Rich went on to amplify his statement by noting that science funding, in general, in the United States is treated no differently than road building; in some years large stretches of highway can be constructed while in others, construction can be reduced drastically depending on highway appropriations. Sharp cuts today in science funding, he noted, create damage to the scientific structure that will persist over many years. He suggested that it might be better to stabilize U.S. funding for science research, even if it was scaled at a lower level, than to conduct it by the inconsistent method which currently prevails.

Foreign Policy Considerations

Although the primary purpose, as observed below, of the cooperative agreements program with the Soviet Union is to further the atmosphere of détente, the chairman had noted that they might be examined nevertheless in terms of their scientific achievements.

Mr. Kratzer addressed his remarks to the original intent of the agreements, as prescribed by the heads of governments, from the State Department's perspective:

> The primary purpose of these summit meetings was to relax tensions, to replace confrontation with negotiation. Thus the agreements on scientific and technical cooperation were concluded at the highest political level as part of the process of normalizing relations between our two countries and, only after sufficient progress had been made on political and arms negotiations, to warrant expansion of our relations in other areas. [p. 43]

He went on to note that cooperation in economic, scientific and cultural fields contribute to the process of détente but, he added, ". . . we do not seek cooperation for its own sake alone." While cooperation in science and technology helps to reduce tensions, Mr. Kratzer said that it would be a mistake to engage in unbalanced research in the name of détente. The agreements would continue only as long as the goals of foreign policy are served, a determination ultimately decided by the Secretary of State on the advice of the Under Secretary of State and the National Security Council.

In assessing progress in foreign policy goals to date, Mr. Kratzer commented:

> We believe considerable progress has been made in establishing a network of individuals and institutions who see it in their interest to engage in cooperation rather than in confrontation. We are establishing useful contacts with higher and broader levels of Soviet officialdom than ever before. We are gaining first-hand knowledge about Soviet developments and exchanging ideas in many areas of mutual interest. [p. 48]

Dr. Fromm expressed his views on the ability of scientific and technical cooperation to reduce tensions.

> An advantage of extensive U.S.-U.S.S.R. interchange is that it helps to reduce uncertainties and creates conditions conductive to rational consideration of foreign economic and political policy alternatives. [p. 93]

He added that cooperation also fosters a recognition of mutual dependence and movements towards mutually assured simultaneous survival.

Concerning the role of the State Department, Mr. Thornton asked whether the oversight function of these agreements is focused in the Department rather than in the Science Advisor to the President. Mr. Kratzer testified that it was in the former, and that oversight is also performed through the executive secretaries coordinating group which deals with problems common to all the agreements.

> In addition to that, both the Office of Soviet and Eastern European Science and Technology Affairs of the Bureau of Oceans and International Environmental and Scientific Affairs, as well as the Office of Soviet Affairs in the European Bureau, are on an almost daily basis in contact with the Executive Secretaries. . . . [p. 52]

Mr. Thornton then inquired about the role played by the National Security Council. Mr. Kratzer replied that the Under Secretary's Committee [6] of the National Security Council, of which he is a member, meets occasionally to review the programs, maintain the oversight function, and establish overall policy.

Finally, Dr. Kassof cautioned against too much State Department influence in the cooperative research aspects of the program from the standpoint of a scientist. He said:

> I think we have to avoid the trend toward associating scientific undertakings in any direct way with diplomatic priorities. It may well be such dangers would arise from the connection with the State Department or the new office under the President [i.e. Office of Science and Technology Policy]. It is something that has to be explored with great care. [p. 103]

He added that we "should try to handle these contacts as worth-while and independent in their own right."

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[6] This Committee is chaired by Robert S. Ingersoll, Deputy Secretary of State, a title for the position formerly known as Under Secretary of State.

Dr. Stever underscored the scientific rather than the technological thrust of the agreements.

> . . . most of the activities in our agreement focus on basic and applied scientific research and not on technology. The Soviets are pursuing their interests in technology in other areas outside of our agreement, primarily through contacts with United States' private companies.
>
> My review of the Science and Technology Agreement, I think, indicates the wide variety of areas and types of activities undertaken in these cooperative programs. [pp. 7–8]

Addressing himself to cooperative research in general, Dr. Kassof raised four basic questions for the Subcommittee's consideration:

> Is there a reasonable balance?
>
> How are participating Americans treated?
>
> What posture should the United States adopt when research does not proceed equitably?
>
> How should these enterprises be implemented?

These have been addressed in other parts of this summary but they are mentioned here to indicate Dr. Kassof's belief that they form an integral part of the evaluating process for cooperative research.

(A) ACADEMY EXCHANGES

The agreements discussed by Dr. Rich between the National Academy of Sciences and the Soviet Academy of Sciences, although not part of the government's cooperative agreements program, illustrate the similarities in the two cooperative efforts. He noted that these agreements grew out of the relaxation of cold war tensions during the late fifties, and were concluded at the initiative of the Soviet government. The National Academy which customarily engages in providing advisory services, now provides three kinds of inter-Academy exchanges.

First, academicians and distinguished persons are exchanged in order to lecture for periods of up to one month. Second, scientists visit each other's country to compare and survey different fields of research. Third, there are also visits for long-term research which extend for about one year. The inter-Academy exchanges have also included symposia visits in subjects such as radio astronomy and partial differential equations.

While these exchanges have been useful, Dr. Rich testified that more substantive, joint research projects were needed.

(B) ROLE OF SCIENTISTS

In assessing cooperative research the Subcommittee examined the treatment received by American scientists abroad as well as their views on the research programs. Dr. Fromm posed and answered two illustrative questions on the subject:

> "What feedback is provided by leading U.S. scientists about their work on cooperative projects?" Participants have been requested to submit reports and have responded to inquiries

about their work on cooperative projects. It would be useful to summarize this information and make it publicly available.

"What assurances have been forthcoming that the best U.S. scientists meet with the best scientists in the Soviet Union?" In the field of application of computers to management both sides have enrolled leading scientists in the program. [p. 96]

Dr. Theodore Cooper, U.S. Co-Chairman on the American side of the Agreement for Cooperation in Medical Science and Public Health, wrote of the frustrations, both personal and professional, felt by American scientists in the U.S.S.R.:

> The many frustrations for Americans working in the U.S.S.R. is one of the program's most difficult problems. The Soviet's austere style of life and the restrictions under which all scientists must work in the Soviet Union are a constant source of complaint by U.S. scientists. The relative isolation of those longer term exchange scientists and the constant dealing with a highly bureaucratic society leads to many personal frustrations. Within research institutions, perennial shortages of equipment and supplies is a problem not familiar to U.S. scientists. [p. 261]
>
> * * * * * * *
>
> We are sometimes aware of changes which we feel could make the program of more benefit to us. In some cases, we might feel these changes would also be more advantageous to the Soviets. For example, some of our scientists would like more contact with scientists outside the immediate jurisdiction of the U.S.S.R. Ministry of Health. Similarly, we would sometimes like more access to less prestigious Soviet medical institutions in Southern and Eastern U.S.S.R. There are also areas of health and medical science research in which we feel the U.S. would have much to gain by cooperative efforts with the Soviets. We often find, however, that the Soviets are restrained in complying with our views. This is often due to their internal legal constraints. In other cases, they feel that they would have little to gain from cooperation in areas where we might find benefit. From our perspective, we view such difficulties as a part of cooperation. [p. 262]

Dr. Fromm noted that scientists from the Soviet Union do not seem to be chosen because of political reliability but rather by reputation. They apparently indicate a willingness to visit the U.S.A. However, he said, "we are . . . suspicious that some of those people we would most like to have come to the United States for scientific reasons, will not be permitted to do so." [p. 96]

Drs. Promisel and Baldeschwieler, who participate in the programs, said that, generally, a good relationship existed between scientists on both sides, and that favorable treatment prevailed.

Reciprocity

If any one concern pervaded the tenor of the hearings, it was: "Is there reciprocity?" That is, was there a quid pro quo in the research, and if so, how can the United States assure its continuation? Dr.

Stever seemed well satisfied that a quid pro quo existed. Further, he felt that the importance of a quid pro quo was not merely limited to the U.S. side. Congressman Conlan on this point inquired:

> Evidence has come to my attention that the U.S.S.R. Commissioners have pretty well dictated the choices for the working group areas and the projects to be conducted. Could you comment on that? [p. 15]

Dr. Stever stated that he did not believe that this was true. He had said previously that "there is abundant evidence of good will and serious intent to engage in productive joint efforts. On the positive side, I can report modest but concrete results." [p. 8]

Dr. Kassof also depicted an atmosphere of good will in the private-sector, IREX program: "Indeed, the actual record comes as a pleasant—and reassuring—surprise. We very carefully follow up Soviet visits to our university campuses and laboratories by comprehensive questionnaires to the American academic and scientific hosts in order to explore this issue." [p. 81] Mr. Train, in speaking of the Environmental Protection Agreement, stated:

> . . . I would say on balance that it is really going as well, and I would suspect in many ways it is going a good deal better, than I had anticipated. I think on balance it is proving to be very successful. [p. 134]

One project that illustrated the good will and mutuality of the cooperation to date was the successful Apollo-Soyuz test project. Dr. Stever commented on the positive response of both the Soviet Union and the United States to this project: "By the way, they are very pleased with the Soyuz-Apollo agreement. Both sides delivered on schedule, and this was a good exchange." [p. 35]

Mr. Kratzer also discussed the Apollo-Soyuz project:

> The most well-known and certainly the most dramatic [project] to date, is the link-up in space last July of the Apollo and Soyuz spacecraft. This historic event has more than symbolic importance. The live, "on the spot" real-time communications were truly remarkable. [p. 46]

Committee members asked for more specific examples of a quid pro quo. Congressman Scheuer commented:

> All I get . . . is we are beginning to start, and that what has happened in the past, has been small but significant. I really would like to have some for instances and perhaps you can get together and submit something for the record. [p. 109]

(Dr. Kassof subsequently submitted for the hearing record a summary of the evaluations provided by the U.S. scientists and scholars who had visited the U.S.S.R. under private-sector IREX programs.[7])

Mr. Train indicated that there seemed to be reciprocity in the Environmental Protection Agreement. He mentioned as an example, the interest shown in the West in the development of oil shale resources.

> The Soviets have been extracting oil from shale for a good many years. It is our understanding that they have developed

[7] See Hearings, p. 112.

> a fair amount of information on atmospheric effects, pollution problems and human health effects from the side products of the retorting process, with which we have no experience. [p. 139]

Other specific examples of mutually beneficial research are reviewed under Part 2, dealing with the three specific agreements discussed at the hearings.

In spite of the general belief that there is reciprocity in the agreements, the witnesses agreed that there should be safeguards to maintain it and measures for "scaling down" those projects that seem to lack it. As noted above, the chairmen of the joint working groups tried to assure continual balance in their respective areas. But there were other reciprocal features, as Dr. Stever noted:

> You do not have to just balance one man or one computer with another adding up the bill here. If a group of scientists spend their time in one of these fields and discovers that it is not getting something back for what it puts in, the scientists are going to refuse to continue the activity. They just will not spend their time without benefit. [p. 13]

Chairman Thornton asked Dr. Stever to describe how decisions are made to curtail or terminate certain projects.

Dr. Stever replied:

> We asked ourselves and the working groups if some of the activities should be stopped. We have slowed down some of them practically to a stop. My feeling is that we do not need at this particular time . . . some of these things. If we are not doing anything on them, then we are not doing anything on them, just let them go down to a low level. [p. 34]

He noted that this method, however, would not be appropriate for the long term, and added that a way should be found to pick those projects which are most promising for both sides. Mr. Kratzer stated that no new projects were currently under consideration.

Dr. Kassof suggested that allowances should be made for those projects that appeared to be lagging, noting that bureaucratic differences between the two nations contributed greatly to these problems. He added:

> But once due allowance has been made, there should be no hesitation to abort projects—and in cases where delays and obstructions have been severe and where efforts and reasonable negotiation have failed, the termination should be exposed to the full glare of publicity so that those having a stake in the continuation of Soviet-American project cooperation and the public imagery that it entails will come to realize the costs of non-performance. [p. 83]

Dr. Fromm testified that the ability to terminate projects should also obtain in cases where it seemed that the U.S.S.R. might become superior to the United States in areas where the latter now leads. Dr. Fromm noted that if U.S. superiority "was seriously threatened by scientific cooperation and this were felt to be detrimental to the national interest," the United States always had the option of curtailing or terminating the program. [p. 94]

The hearings reflected both pluses and minuses on the question of mutuality of benefits as did the statements submitted subsequently from lead agencies which had not testified. Robert W. Long, U.S. Vice-chairman of the U.S.-U.S.S.R. Joint Committee on Agricultural Cooperation and Assistant Secretary of Agriculture for Conservation, Research and Education, stated on this issue that:

> The major problem, and the largest of all problems with the entire Agreement, is the failure so far of the Soviets to provide current situation and outlook data [i.e. forecast estimates] on production, utilization and foreign trade of major agricultural commodities. [p. 290]

The Soviet refusal to provide the above data to the U.S. side has had the net effect of making "the benefits obtained by the Soviets from the Agreement larger so far than those received by the United States, measured entirely in agricultural and agriculturally-related terms. Agreement activities have not yet proceeded far enough to make this imbalance unacceptable to the United States, but there is watchful concern." [p. 293]

The statement from the Department of Transportation, while noting that the Soviets had conducted themselves in a "forthcoming and businesslike way", indicated two problems, among others, affecting cooperation:

> [1] We have found that, despite their assertions to the contrary, the Soviets lag behind the U.S. in some areas where we had hoped to gain from their experience (e.g., magnetic levitation).
>
> [2] In order to maximize the cooperative relationship, we need more information concerning what the Soviets have to offer. In most cases we have to rely on what they say is available. Their task is easier because much of what is new here is covered in the open press. [p. 316]

The testimony indicated that overall there appeared to be a comparable level of scientific contributions, although, the achievements were modest to date.

PART 2: THREE PROMISING AGREEMENTS

Testimony was presented on three specific scientific agreements: Scientific and Technical Cooperation; Studies on the World Ocean; and Environmental Protection. These three, the most successful among the eleven agreements, are reviewed here as will be certain of the projects conducted under them.

The Agreement on Scientific and Technical Cooperation

Three witnesses, Dr. H. Guyford Stever, Dr. Nathan Promisel, and Dr. John Baldeschwieler discussed the agreement on Scientific and Technical Cooperation. Dr. Stever addressed his remarks to the agreement in general, and Drs. Promisel and Baldeschwieler reviewed developments in their respective working groups on electrometallurgy and chemical catalysis:

(A) ELECTROMETALLURGY WORKING GROUP

According to the witnesses this working group appeared to be the most successful under the Scientific and Technical Agreement. Dr. Stever stated in his remarks:

> . . . the number one area, in terms of mutual benefit for the United States is electrometallurgy."
>
> * * * * * * *
>
> . . . of the 12 science areas, substantial mutual benefits are most likely to be achieved in the field of electrometallurgy. Looking at prospects for United States benefits, we have confirmed the high Soviet state of the art in electroslag ingot castings, especially the ability to cast large ingots; plasma-arc melting; extractive metallurgy and reduction; purification and casting techniques; electron beam coating; and design of welding materials for specific tensile strengths and for arctic operations—including methods for predicting weld properties and testing of cryogenic materials and their welds. Welding materials and large ingots are being exchanged. [p. 5]

Because witnesses had contended that electrometallurgy was the most successful area for U.S.-U.S.S.R. cooperation, the Members asked for specific, supporting details. Congressman Conlan, for example, asked Dr. Stever for ". . . concrete examples of where the Soviets have approached these agreements on the basis of mutual benefit, equality and reciprocity . . . ." Dr. Nathan Promisel, U.S. chairman of the Working Group on Electrometallurgy, responded for Dr. Stever:

> They are sending us an ingot of a very unusual material which cannot be at the moment produced in this country. It

> is roughly the size of a half-ton. It is for our evaluation. It has cost us nothing. The quid pro quo is that we will tell them what we think of it after we have examined it. [p. 31]

Dr. Promisel provided detailed description of the working projects in electrometallurgy, the role of the Soviets and that of the United States. In his concluding remarks, he observed:

> The program on which we have embarked with the Soviets appears most promising to us, in terms of important contributions to our materials technology, basic understanding, industrial applications, problem-solving and future design of equipment and processing. Although we anticipate a high degree of success in achieving our objectives, we obviously cannot, at this stage, give broad "guarantees." [p. 206]

Beyond the specific technical achievements which Dr. Promisel outlined he also commented on less tangible benefits of the agreement:

> We have been able to identify people and places of excellence in the U.S.S.R. and to achieve valuable personal rapport, understanding, and familiarity at higher levels than we would normally be able to reach and over a much broader sector of the science and engineering community over there. The joint research studies are expected to provide us with desirable knowledge at less cost to the United States in money and manpower than if we worked alone. [p. 206]

Finally, he noted that there have been no significant problems in his particular field:

> Any differences have been reconciled by friendly and objective discussion and cooperation on both sides. I think each side has managed to include in the final program those features in which it was itself very interested. [p. 206]

(B) CHEMICAL CATALYSIS WORKING GROUP

Witnesses indicated that the area on chemical catalysis is another promising one under the Scientific and Technical Agreement. Dr. Stever noted that, as in other areas, there are some aspects in which the Soviets have something to offer, such as in the field of:

> . . . chemical catalysis, [where] one project in life support systems, is [in] delving into the chemical reactions which are produced from exhaled carbon dioxide and sugars to be eaten by astronauts during extended space missions. We discovered that the nature of the reaction to produce the sugars was first researched by a Russian scientist. [p. 5]

Dr. John Baldeschwieler, Chairman of the Working Group on Chemical Catalysis, testifying in more detail on the group's projects, commented that, because Soviet industrial technology lags behind America's and that of Western Europe, the United States has had to choose joint projects with particular care.

> It was in our interest to focus the program on the basic area where we felt they in fact had something to deliver. We have been successful in designing a program which has as its focus the basic research part of the catalyst work. [p. 211]

Projects within this group include:

- Organo-metallic compounds used as catalysts;
- Reactor modeling;
- In-depth study of selected catalytic systems;
- Catalysts in developing life support systems for long term space travel;
- Environmental control with a focus on decomposition of nitric oxide.

Dr. Baldeschwieler expressed optimism for these projects. He said: "In the two and a half years we have been operating we have in fact managed to get a substantial number of exchanges both ways." [p. 215] He provided a list of publications, which resulted from the exchanges, for the hearing record. [pp. 220–21]

Concerning problem areas, Dr. Baldschwieler indicated that most of these were of an administrative nature, stemming from the different ways in which the United States and the Soviets performed their research.

> There are various asymmetries in the way the United States and the Soviet Union do research that, of course, enter this kind of program. And of these asymmetries, I think perhaps the most important one is the fact that the fellows we send to the Soviet Union are normally fresh Ph. D.'s just beginning their post-doctoral work.
>
> * * * * * * *
>
> The Soviet fellows on the other hand have been somewhat older. They have been people who would, in our system, be regarded as perhaps equivalent to senior research fellows. . . . [p. 215]

There is also an asymmetry, he continued, in the way the Soviets deliver or follow-up their programs.

> My principal concern is with [working group] project number one [i.e. organo-metallic compounds used as catalyst work] where we have a lot to gain and the Soviets have not as yet delivered in full on our original agreement. In this case we have been reasonably tough, that is to say, the Soviets are anxious to bring additional U.S. capability into this area, that is, some work on the structure of zirconium and titanium complexes, and we have taken the position that we will do this only when they deliver in full on that portion of the project which has already been agreed to. [p. 216]

In spite of such problems, Dr. Baldeschwieler noted progress had been greater than he had initially expected.

The Agreement in Studies of the World Ocean

The Agreement in Studies of the World Ocean, signed in June 1973, was discussed by Dr. Donald Martineau, Executive Secretary of the Agreement, Lt. Commander Charles Molyneaux, International Coordinator for Plans and Programs, Marine Resources, National Oceanic and Atmospheric Administration, and Dr. Ned Ostenso, Senior Oceanographer and Deputy Director of the Ocean Science and

Technology Division, Office of Naval Research. Cooperative oceanographic and fisheries investigations have been in operation between the United States and the U.S.S.R. for the past two decades and this agreement had had its root in the exchange of marine scientists in 1972.

In terms of organization and procedure, Dr. Martineau testified that the World Ocean Agreement paralleled that of the Agreement on Scientific and Technical Cooperation discussed by Dr. Stever. In the Ocean Agreement, the U.S. side of the Joint Committee is chaired by the Administrator of the National Oceanic and Atmospheric Administration, Dr. Robert White. Other members on the Committee included the Under Secretary of the Navy, as Vice Chairman, and policy level officials representing the National Science Foundation and the Department of State. In addition, the National Advisory Committee for the Oceans and Atmosphere and the National Academies of Science and of Engineering provide members.

Dr. Martineau noted:

> As of this date, there is a total of fifteen cooperative projects: with three in the area of ocean-atmosphere interactions; two concerning ocean currents and dynamics; six in the area of marine geology, geophysics and geochemistry, including deep-sea drilling; three on biological productivity; and one concerning instrumentation. With the exception of geochemistry and marine chemistry studies, there are projects in all areas of the Agreement. [p. 63]

In the area of world ocean cooperation, there have been more antecedents than in the Agreement in Scientific and Technical Cooperation. Thus, Dr. Martineau stated, the status and achievements to date depend upon the individual cooperative projects—some of which started earlier than others.

Besides the areas noted above, the United States and the U.S.S.R. concluded a Deep-Sea Drilling Project in February 1974 through a separate Memorandum of Understanding between the National Science Foundation and the Soviet Academy of Sciences. For this particular project, Dr. Martineau explained, the Soviet Union annually contributes one million dollars, and in turn, the United States provides accommodations for Soviet scientists on each cruise of the *Glomar Challenger*. During some voyages, he added, they serve as co-chief scientists.

Asked by Chairman Thornton if he could make an evaluation of the projects under the World Ocean Agreement, Dr. Martineau replied that the projects varied across the board and depended on the state of cooperation existing at the time when the agreement was signed. He continued:

> I would cite, for example, the GATE [Global Atlantic Tropical Experiment] experiment in the Atlantic. The planning for that, as a multi-national program was proceeding and moving along. Both countries did feel however, that they should make efforts to cooperate through that international activity to see that it was carried out successfully. They were the two major participants in that project. The field program has been concluded. We are now in the analytical stages. The

data is being analyzed by both countries. I am sure there will be exchanges and symposia and meetings. [p. 73]

Concerning the mutual benefits of the research, the witness was asked whether U.S. scientists had ever sailed on Soviet ships as Soviet scientists had sailed on U.S. research ships. Dr. Martineau responded that U.S. scientists did sail on Soviet research ships and, moreover, there are probably more U.S. scientists aboard Soviet ships than the converse—excluding the activities of the *Glomar Challenger* which is under a separate agreement.

In concluding his testimony, Dr. Martineau stated that he believed that the World Ocean Agreement had ". . . provided a means of facilitating the cooperative efforts by the two nations, and it has brought together their capabilities and interests to work cooperatively on problems of mutual interest." [pp. 66–7]

The Agreement on Environmental Protection

The U.S.–U.S.S.R. Agreement on Cooperation in the Field of Environmental Protection, signed in May 1972, was one of the original Moscow summit meeting agreements for joint research between the United States and the Soviet Union. Mr. Russell Train, Administrator for the Environmental Protection Agency, explained that as former Chairman of the Council on Environmental Quality, he was responsible for the negotiation of the Agreement, although the lead agency now is the EPA.

The original agreement provided for eleven major areas of bilateral cooperation: air pollution; water pollution; pollution related to agricultural production; urban environment; nature and preserves; marine pollutions; biological and genetic effects of pollution; influence of pollution of the atmosphere on the climate; earthquake prediction; arctic and subarctic ecology; and legal and administrative measures for environmental protection.

Generally, Mr. Train's testimony indicated success to date with the mutual in exchange of benefits and a belief that the projects under this agreement will continue to succeed. Based on his experience as Co-Chairman of the U.S. side of the Joint Committee, he stated:

> . . . Soviet leadership, like ours, realizes the benefits, domestically and internationally, to be gained from bilateral environmental cooperation between two of the world's leading industrial powers, notwithstanding the differences in their political, economic, and social systems. [p. 120]

As further evidence of cooperation, Mr. Train discussed some ongoing projects and exchanges indicative of a continuing mutuality. In 1974, for example. he noted that 50 meetings occurred during which a great deal of information was exchanged on the basis of reciprocity and mutual benefit. He continued:

> We began to see tangible evidence of what our environmental specialists working together could produce. For example:
>
> Working side by side with each other's equipment along the San Andreas Fault in California and the highly seismic Garm areas of Tadzhikistan in Soviet Central Asia, U.S. and

> Soviet scientists improved their techniques and data analysis to refine their ability to predict earthquakes and thereby to reduce earthquake damage. [p. 124]

Although Mr. Train detailed several other areas of mutual exchange under this agreement, both Chairman Thornton and Congressman Scheuer raised questions concerning overall cooperation. Both were concerned over the apparent lack of cooperation in protecting the whale. In reference to the 1972 meeting of the International Whaling Commission Mr. Scheuer asked:

> What was the attitude of the Russians to doing something to preserve the integrity of the whale on our planet? [p. 120]

Mr. Train responded:

> I think what we have seen on the Soviet side is a steady movement toward a far more positive position for the protection of the whales.

Congressman Scheuer then asked for supportive evidence, commenting:

> We know it is an issue, and we have been after the Russians and the Japanese year after year after year to do something to prevent the whale from being obliterated from our oceans. Has there been any change in the Russian position that you can identify here? * * *
>
> As I understand it, the Russians and the Japanese are stonewalling us. Am I wrong? [p. 121]

Mr. Train responded:

> They are continuing to insist on commercial whale hunting, yes. They have opposed a total moratorium in the International Whaling Commission. That is correct.
>
> They have, however, . . . supported a substantial reduction in whale quotas at this last meeting of the International Whaling Commission. [p. 121]

Mr. Train however, testified that the Russians had not as yet proposed any time period for phasing out whale hunting.

Congressman Scheuer observed that "I think we have to be a little more hard-nosed in what we are giving and what we are getting". [p. 122]

In spite of the difficulty in reaching a moratorium over whale hunting, Mr. Train expressed optimism for the agreement, and for secondary benefits made possible by the agreement. For example, he discussed the problem of ocean dumping. While the Russians did not attend the U.N. Conference on the Environment, held in Stockholm in 1972, they did attend a follow-up conference on ocean dumping in London later the same year. He attributed this to the Joint Commission meeting, held in the Soviet Union which met in between those conferences, and which afforded him an opportunity to urge members of the U.S.S.R.'s State Committee on Science and Technology to attend the second conference.

Mr. Train indicated that he could foresee a continuation of reciprocity based on mutual interest and mutual benefits. He concluded:

> In my view, one of the special characteristics of the Environmental Agreement is the extraordinary scope of its coverage. It opens up an unusually wide range of positive opportunities for cooperation to the mutual benefit of both nations. To be sure, some obstacles remain, but on the basis of the record we have achieved to date, I am confident we can succeed. [p. 130]

APPENDIX

List of Witnesses and Statements

HEARINGS ON U.S.-U.S.S.R. COOPERATIVE AGREEMENTS IN SCIENCE AND TECHNOLOGY

November 18, 1975:

Dr. H. Guyford Stever, Science Advisor to the President; Director, National Science Foundation; and U.S. Co-Chairman, U.S.-U.S.S.R. Agreement on Scientific and Technical Cooperation.

Mr. Myron Kratzer, Acting Assistant Secretary for Oceans and International Environmental and Scientific Affairs, Department of State:

accompanied by Dr. Oswald Ganley, Acting Deputy Assistant Secretary of State for Advanced and Applied Technology Affairs.

Dr. Donald P. Martineau, Deputy Associate Administrator of Marine Resources, National Oceanic and Atmospheric Administration, Department of Commerce, and Executive Secretary, U.S.-U.S.S.R. Agreement in Studies on the World Ocean:

accompanied by LCDR. Charles Molyneaux, International Coordinator, Plans and Programs, Marine Resources, National Oceanic and Atmospheric Administration, and Dr. Ned A. Ostenso, Senior Oceanographer, Office of Naval Research.

November 19, 1975:

Dr. Allen H. Kassof, executive director, International Research and Exchanges Board, New York, New York.

Dr. Gary Fromm, Director, Washington Office, National Bureau of Economic Research.

November 20, 1975:

Mr. Russell Train, Administrator, Environmental Protection Agency; U.S. Co-Chairman, U.S.-U.S.S.R. Agreement on Environmental Protection:

accompanied by Dr. William A. Brown, special assistant to Mr. Train, and executive secretary of the U.S. side, U.S.-U.S.S.R. Joint Committee on Cooperation in the Field of Environmental Protection.

Dr. Nathan E. Promisel, Executive Director (emeritus), National Materials Advisory Board, National Academy of Sciences; U.S. Chairman, Working Group on Electrometallurgy.

Dr. John D. Baldeschwieler, Chairman, Division of Chemistry, and Chemical Engineering, California Institute of Technology; U.S. Chairman, Working Group on Chemical Catalysis.

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Dr. Alexander Rich, Sedgwick Professor of Biophysics, Department of Biology, Massachusetts Institute of Technology; Chairman, Scientific Exchange Board, National Academy of Sciences.

Statements Subsequently Received from Lead Agencies on Agreements on: Medical Science and Public Health; Space; Agriculture; Transportation; Peaceful Uses of Atomic Energy; Energy; Housing and Other Construction: (Artificial Heart R&D is included in Medical Science and Public Health).

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